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(71) Applicant
Kevin Charles Hodger
48 St Helens Down, Hastings, East Sussex, TN34 2BQ, United Kingdom

(72) Inventor
Kevin Charles Hodger

(74) Agent and/or Address for Service
Brookes & Martin
High Holborn House, 52-54 High Holborn, London, WC1V 6SE, United Kingdom

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GB 2170916 A

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(54) Tool for constructing timber roofs

(57) A tool is provided for enabling the ends of roof rafters, hips and purlins to be readily cut at the required angles.

The tool comprises a generally triangular sheet 10, having two edges disposed at right-angles 11 to each other, carrying a set point 14 at or in the region of one corner thereof, not being a right-angle. One or more curved scales 18 of pitch angles are provided on one major face of said sheet, the scales being centred on said set point 14. At least one base or opposite side 19, 20 relative to said one corner have markings therealong indicating the marking edge appropriate to the rafter, jack, hip, purlin or layboard cut position.

Preferably an adjustable straight edge 13 is provided pivotable about the set point.

With this tool the ends of all the various types, lengths and pitches of rafters, hips and purlins can be accurately marked and cut ready for use.

Fig. 1.

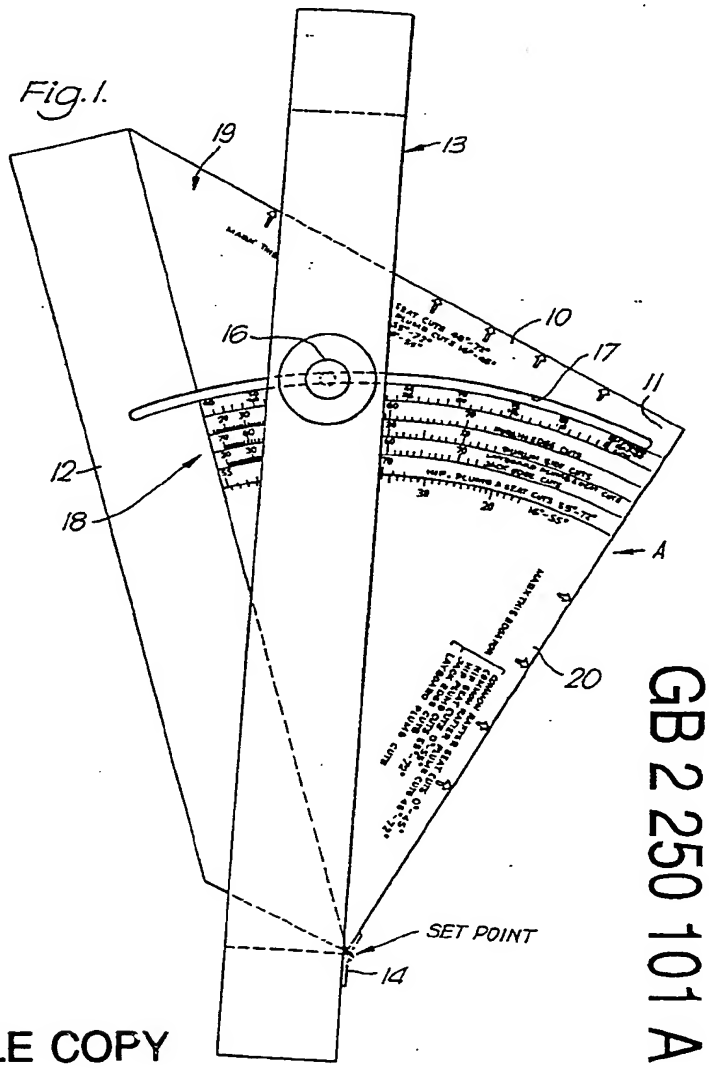

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Fig. 1.

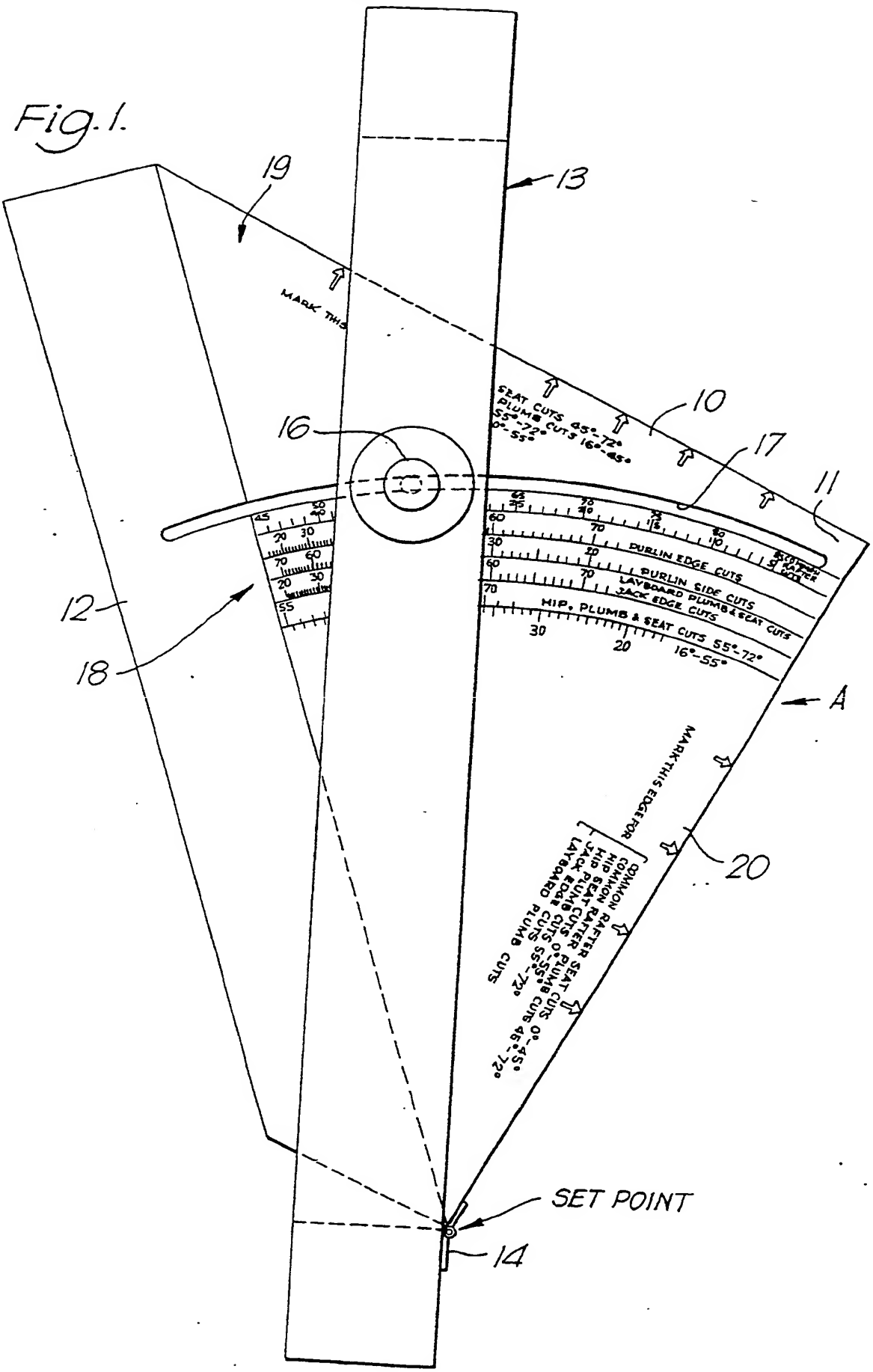


Fig. 2.

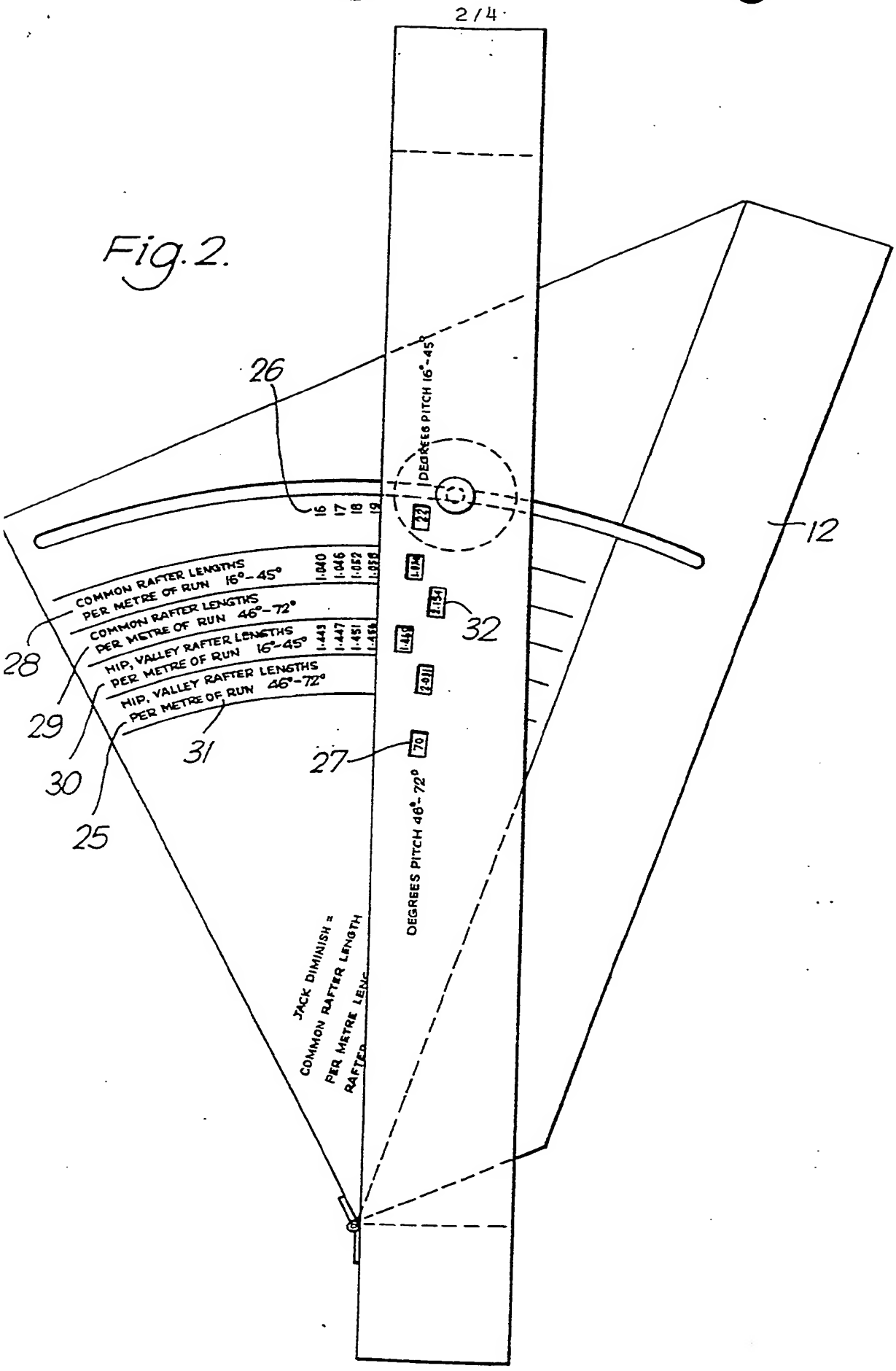
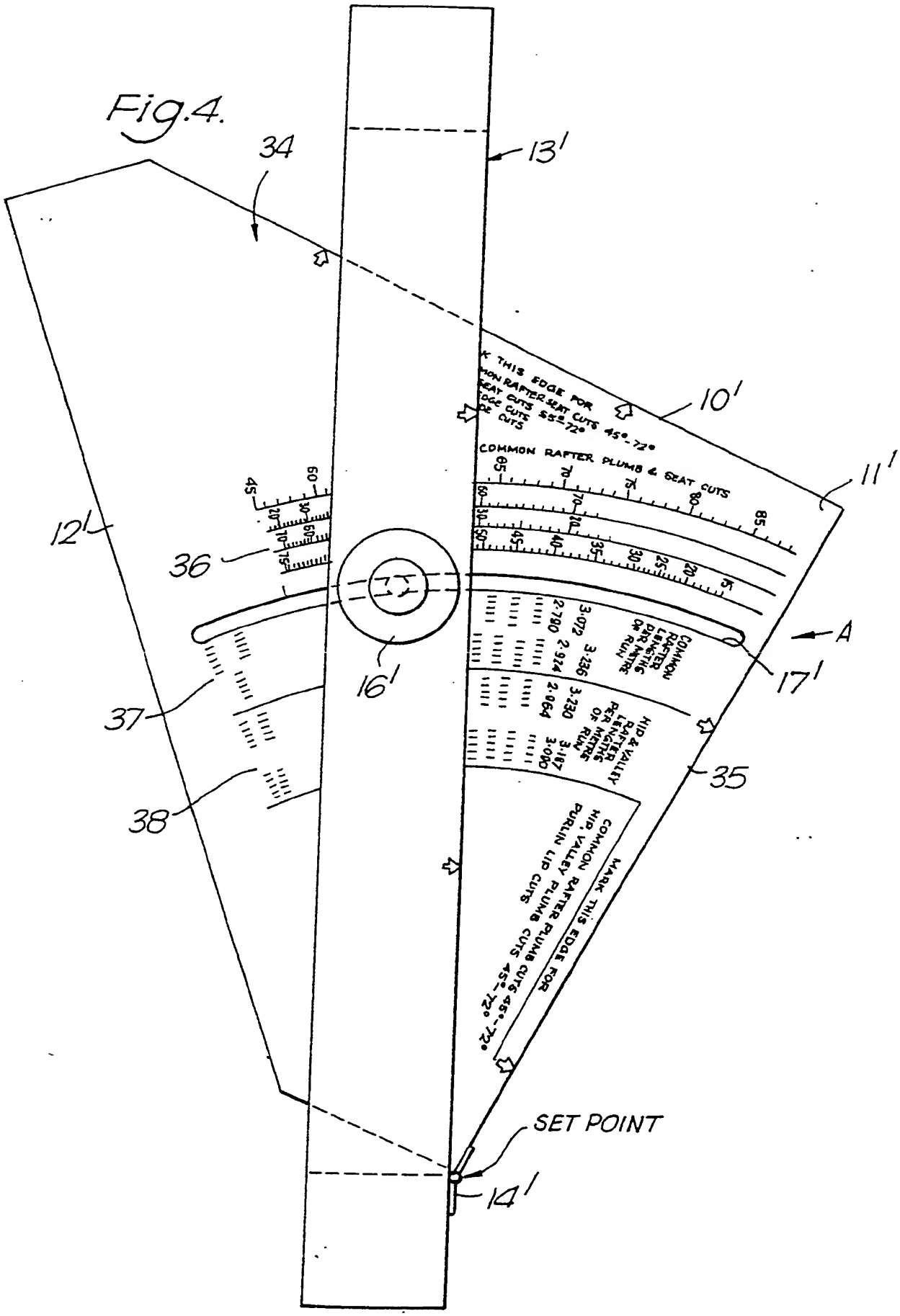


Fig.4.



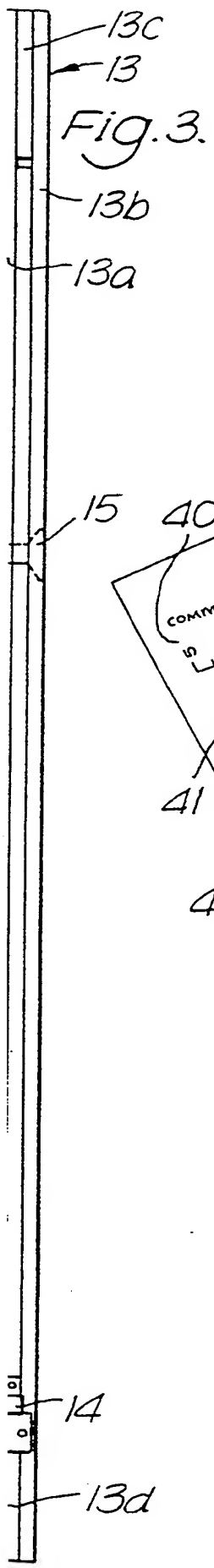
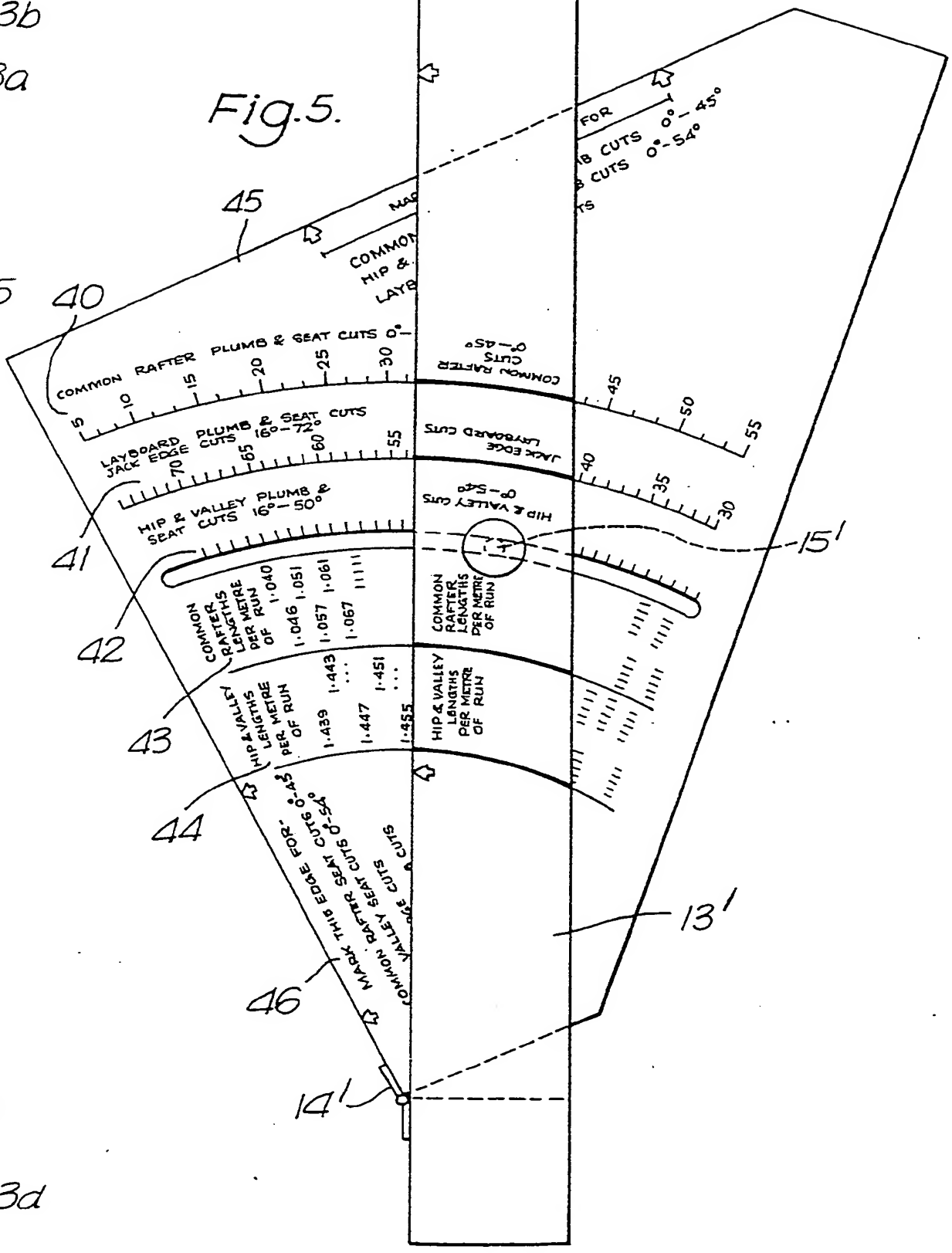


Fig.3.

Fig.5.



TOOL FOR CONSTRUCTING TIMBER ROOFS

This invention relates to a tool for constructing timber roofs and in particular for enabling the ends of rafters, hips and purlins to be readily cut at the required angles and lengths.

Roofs for various buildings require rafters at a great variety of angles and lengths ranging from 5 degree to 75 degree pitch and the ends of the rafters and purlins have to be cut at a great variety of angles to match the meeting ends with each other or with ridge boards. The complication and variety of timber roofs can be seen for example in the book "Roofing Ready Reckoner" compiled by Ralph Goss and published by Granada Publishing Limited, 8 Grafton Street, London.

To assist a joiner in cutting the correct angles he can use a protractor in combination with a carpenter's bevel but to consult such a complicated book for each of the many angles required is hardly practicable for a roofing joiner at work on site.

A tool has been proposed to enable a joiner to mark rafters with required angles and this is described in British Patent Specification No 1253680 but this has rather limited utility and does not provide for all the variety of pitch degrees and lengths of rafters, hips and purlins.

According to the present invention a tool for indicating angles of cut for the ends of rafters, hips and purlins comprises a generally triangular sheet, having two

marking edges disposed at right-angles to each other, carrying a set point at or in the region of one corner thereof, not being a right-angle, and one or more curved scales of pitch angles are provided on at least one major face of said sheet, said scales being centred on said set point, at least one base or opposite side margin relative to said one corner having markings therealong indicating the marking edge appropriate to the rafter, jack, hip, purlin or layboard cut position.

Preferably an adjustable straight edge is provided which is pivotable about the set point and extends from the set point to positions beyond the or all of the scales of pitch angles.

Alternately, a tool has arranged on one major side of the sheet scales of pitch angles for determining the cutting position of common rafter seat and plum cuts; purlin edge cuts; purlin side cuts; purlin lip cuts; and hip plumb and seat cuts; and on the other major side scales of pitch angles for determining the cutting position of common rafter plumb and seat cuts; layboard plumb and seat cuts and jack edge cuts; and hip and valley plumb and seat cuts.

In use the above-mentioned tool is applied to the wood by placing this at a suitable position on the wood with the set point aligned with the edge of the wood, adjusting the angle of the tool around the set point according to the pitch degrees, and marking the wood along the appropriate edge of the tool as indicated thereon.

The invention will be further described by way of example with reference to the accompanying drawings in which:

FIGURE 1 is a plan view of a setting tool,

FIGURE 2 is a reverse plan view,

FIGURE 3 is an edge view, on a smaller scale, seen in the direction of the arrow A indicated in Figures 1 and 4,

FIGURE 4 is a plan view of a second embodiment of the setting tool, and

FIGURE 5 is a reverse plan view of the embodiment of Figure 4.

The tool comprises a sheet or board 10 of rigid opaque or transparent plastics material having a generally triangular shape, two edges of the sheet being disposed at right angles to each other from a corner 11.

The board 10 is contiguous with a substantially rectangular marginal strip 12 set at 45° along the hypotenuse of the board 10.

An adjustable guide member 13 comprising two identical strips 13a, 13b of plastics material separated by spacers 13c, 13d, is pivotally mounted at one 45° corner by a hinge 14. The spacing between the strips 13a, 13b is such that the board can slide between them with a close fit.

The guide member can be secured in the required set position by a screw 15 and nut 16. The screw 15 can move between end positions of a slot 17 formed in the board 10.

A series of arcuate pitch angle scales centred on the pivot of the hinge 14 is indicated by engraving at 18;

these read as follows considered from the outside:

Scale	45° to 85°	
Scale	45° to 5°	COMMON RAFTER CUTS
Scale	20° to 70°	PURLIN EDGE CUTS
Scale	70° to 20°	PURLIN SIDE CUTS
Scale	20° to 70°	LAYBOARD PLUMB AND SEAT CUTS JACK EDGE CUTS
Scale	55° to 72°	
Scale	50° to 20°	HIP PLUMB & SEAT CUTS 55°-72° 16°-55°

The opposite (i e in relation to the set point 14) marginal region 19 is marked by engraving as follows:

MARK THIS EDGE FOR

COMMON RAFTER SEAT CUTS 45°-72°
COMMON RAFTER PLUMB CUTS 16°-45°
HIP SEAT CUTS 55°-72°
HIP PLUMB CUTS 0°-55°
PURLIN EDGE CUTS
PURLIN SIDE CUTS
LAYBOARD SEAT CUTS

The opposite marginal region 20 is marked by engraving as follows:

MARK THIS EDGE FOR

COMMON RAFTER SEAT CUTS 0°-45°
COMMON RAFTER PLUMB CUTS 45°-72°
HIP SEAT CUTS 0°-55°
HIP PLUMB CUTS 55°-72°
JACK EDGE CUTS
LAYBOARD PLUMB CUTS

Armed with this tool the joiner can mark the ends of all the various types, lengths and pitches of rafters, hips and purlins so that they can be accurately cut ready for use. The joiner merely sets the required "pitch angle" e g 59° in the drawing and places the guide member 13 against the sides of the rafter where part of the required cut is to be made e g the starting point for sawing, then marks the rafter along the edge of the tool according to which cut is to be made.

The markings may be ink marks or engraving with ink marks.

The special advantage to the user is that once he or she has been apprised of the angle of the pitch of the roof e g from the architect's drawings, this angle will set on the tool and will be used respectively for marking common rafters, jack rafters, hips, valleys, layboards, or purlins, e g after setting the guide for marking common rafters the guide may be shifted to the same angle on another scale for marking the hips.

The reverse side of the tool as shown in Figure 2 may be provided with scales 25 for the purpose of determining rafter lengths in dependence upon the prescribed pitch angle. Two scales 26, 27 represent respectively pitches of 16°-45° and 46°-72° and scales of numerals 28, 29, 30, 31 represent respectively common rafter lengths per metre of run of pitch angles of 16°-45°; common rafter lengths per metre of run of pitch angles of 46°-72°; hip, and valley rafter lengths per

metre of run of pitch angles 16°-45°; and hip and valley rafter lengths per metre of run of pitch angles 46°-72°.

Windows 32 are provided in one strip of the straight edge through which numerals indicating the set angle and appropriate rafter length per metre of run can be viewed.

The rafter length reading from the tool gives the length of the rafter for each metre it runs, measured horizontally. Therefore if the reading is multiplied by the total run (i e half the span) the rafter length will be obtained.

The embodiment shown in Figures 4 and 5 is mechanically constructed as before and comprises a sheet 10' of rigid opaque plastics material having a generally triangular shape, two edges of the sheet being disposed at right angles to each other from a corner 11', a substantially rectangular marginal strip 12' being provided along the hypotenuse. An adjustable guide member 13' comprising two strips of plastics material separated by spacers is pivotally mounted at the set point by a hinge 14'.

A screw 15' and a nut 16' secures the guide member after setting, being movable along a slot 17' formed in the sheet 10'.

On the obverse side (Figure 4) there is engraved a series of scales 36 centred on the hinge 14' marked and labelled as follows:

A scale graduated 45° to 85° and "COMMON RAFTER PLUMB & SEAT CUTS"

" " " 20° to 70° " "PURLIN EDGE CUTS"

" " " 20° to 70° " "PURLIN EDGE CUTS"

" " " 70° to 20° " "PURLIN SIDE CUTS"

" " " 75° to 15° " "PURLIN LIP CUTS"

" " " 55° to 72° " "HIP PLUMB & SEAT CUTS 55°-72°"

Disposed radially inside the series of scales 36 there are provided two groups of scales 37, 38 representing respectively (i) common rafter and (ii) hip & valley rafter lengths per metre of run graduated according to a range of pitch angles.

The opposite (i e to the set point 14) marginal region 34 is marked by engraving as follows:

MARK THIS EDGE FOR

COMMON RAFTER SEAT CUTS 45°-72°
HIP SEAT CUTS 55°-72°
PURLIN EDGE CUTS
PURLIN SIDE CUTS

The base marginal region 35 is marked by engraving as follows:

MARK THIS EDGE FOR

COMMON RAFTER PLUMB CUTS 45°-72°
HIP & VALLEY PLUMB CUTS 45°-72°
PURLIN LIP CUTS

The guide member 13' is marked on the obverse side

(Figure 4), considered from the outside, as follows:

COMMON RAFTER CUTS 45°~72°

PURLIN EDGE CUTS

PURLIN SIDE CUTS

PURLIN LIP CUTS

HIP CUTS

COMMON RAFTER LENGTHS
PER METRE OF RUN 45°~72°

HIP & VALLEY LENGTHS
PER METRE OF RUN 54°~72°

The latter markings are disposed at regions which are spaced progressively radially further from the pivot point and which coincide respectively with the scales of angles and the numerals representing lengths per metre of run arranged arcuately and concentrically on the sheet 10'.

The reverse side of the tool (see Figure 5) is marked with a series of pitch angle scales 40, 41, 42 centred on the pivot of hinge 14' and labelled as follows:

COMMON RAFTER PLUMB & SEAT CUTS 16°~45°

LAYBOARD PLUMB & SEAT CUTS 16°~72°

JACK EDGE CUTS 16°~72°

HIP & VALLEY PLUMB & SEAT CUTS 16°~54°

Disposed radially inside the scales 40, 41, 42 there are provided two groups of scales 43, 44 representing

respectively (i) common rafter lengths and (ii) hip & valley rafter lengths per metre of run graduated according to ranges of pitch angles complementary to the ranges of pitch angles on the obverse side (Figure 4).

The opposite marginal region 45 is marked by engraving as follows:

MARK THIS EDGE FOR	
COMMON RAFTER PLUMB CUTS	0°~72°
HIP & VALLEY PLUMB CUTS	0°~54°
LAYBOARD SEAT CUTS	

The base marginal region 46 is marked by engraving as follows:

MARK THIS EDGE FOR	
COMMON RAFTER SEAT CUTS	0°~45°
HIP & VALLEY SEAT CUTS	0°~54°
JACK EDGE CUTS	
LAYBOARD PLUMB CUTS	

The guide member 13' is marked on the reverse side as follows:

COMMON RAFTER CUTS 0°~45°

JACK EDGE AND LAYBOARD CUTS

HIP & VALLEY CUTS 0°~54°

COMMON RAFTER LENGTHS
PER METRE OF RUN

HIP & VALLEY LENGTHS
PER METRE OF RUN

The latter markings are disposed at regions which are spaced progressively radially further from the pivot and which coincide respectively with the scales of angles and the numerals representing lengths per metre of run arranged arcuately and concentrically.

The scale of degrees and lengths are derived from trigonometrical calculations. Accordingly, no complicated calculations are necessary for the user as has been the practice hitherto.

It is particularly convenient to the user that a common set point is provided for setting all of the cut positions.

CLAIMS:

1. A tool for indicating angles of cut for the ends of rafters, hips and purlins comprises a generally triangular sheet, having two marking edges disposed at right-angles to each other, carrying a set point at or in the region of one corner thereof, not being a right-angle, and one or more curved scales of pitch angles are provided on at least one major face of said sheet, scales being centred on said set point, at least one base or opposite side margin relative to said one corner having markings therealong indicating the marking edge appropriate to the rafter, jack, hip, purlin or layboard cut position.

2. A tool as claimed in claim 1, wherein scales of pitch angles are provided for determining the cutting position of common rafter seat cuts, common rafter plumb cuts, hip seat cuts, hip plumb cuts, purlin edge cuts, purlin side cuts, layboard seat cuts, layboard plumb cuts, jack edge cuts, hip seat cuts, hip plumb cuts, valley seat cuts, and valley plumb cuts.

3. A tool as claimed in claim 2, wherein the sheet is marked along the opposite margin with respect to said one corner "MARK THIS EDGE FOR: COMMON RAFTER SEAT CUTS 45°-72°, COMMON RAFTER PLUMB CUTS 16°-45°, HIP SEAT CUTS 55°-72°, HIP PLUMB CUTS, PURLIN EDGE CUTS, PURLIN SIDE CUTS, LAYBOARD SEAT CUTS", and is marked along the base margin with respect to said one corner "MARK THIS EDGE FOR: COMMON RAFTER SEAT CUTS 0°-45°, COMMON RAFTER PLUMB CUTS 45°-72°,

HIP SEAT CUTS 0°-55°, HIP PLUMB CUTS 55°-72°, JACK EDGE CUTS, LAYBOARD PLUMB CUTS".

4. A tool as claimed in claim 1, 2 or 3, wherein one or more curved further scales of pitch angles and of rafter lengths per metre of run are provided on the other major face, said further scales being centred on said set point.

5. A tool as claimed in claim 4, wherein the scales of rafter lengths represent respectively common rafter lengths for pitches of 16°-45°, common rafter lengths for pitches of 46°-72°, hip and valley rafter lengths for pitches of 16°-45° and hip and valley rafter lengths for pitches of 46°-72°.

6. A tool as claimed in claim 1, wherein on one major side of the sheet there are provided scales of pitch angles for determining the cutting position of common rafter seat and plum cuts; purlin edge cuts; purlin side cuts; purlin lip cuts; and hip plumb and seat cuts; and on the other major side there are provided scales of pitch angles for determining the cutting position of common rafter plumb and seat cuts; layboard plumb and seat cuts and jack edge cuts; and hip and valley plumb and seat cuts.

7. A tool as claimed in claim 6, wherein the sheet is marked on said one major side along the opposite margin with respect to said one corner "MARK THIS EDGE FOR: COMMON RAFTER SEAT CUTS 45°-72°, HIP & VALLEY SEAT CUTS 45°-72°, PURLIN EDGE CUTS, PURLIN SIDE CUTS, and is marked also on

said one major side along the base margin with respect to said one corner "MARK THIS EDGE FOR: COMMON RAFTER PLUMB CUTS 45°-72°, HIP & VALLEY PLUMB CUTS 55°-72°, and PURLIN LIP CUTS"; and is marked on said other major side along the opposite margin "MARK THIS EDGE FOR; COMMON RAFTER PLUMB CUTS 45°-72°, HIP & VALLEY PLUMB CUTS 45°-72°, LAYBOARD SEAT CUTS"; and along the base margin "MARK THIS EDGE FOR: COMMON RAFTER SEAT CUTS 0°-45°; HIP & VALLEY SEAT CUTS 0°-54°; JACK EDGE CUTS"; and LAYBOARD PLUM CUTS".

8. A tool as claimed in claim 6 or 7, wherein on or more curved further scales of quadrilateral number, related to a first range of pitch angles, representing (i) common rafter lengths and (ii) hip and valley lengths per metre of run are provided o said one major face, said further scales being centred on said set point; and on the other major face are provided one or more curved further scales of graduated numbers, related to a further range of pitch angles representing (iii) common rafter lengths per metre of run, and (iv) hip and valley lengths per metre of run.

9. A tool as claimed in claim 4, wherein the scales of rafter lengths represent respectively on said one face common rafter lengths for pitches of 45°-72°, hip and valley rafter lengths for pitches of 54°-72°, common rafter lengths for pitches of 0°-45°, and hip and valley rafter lengths for pitches of 0°-54°.

10. A tool as claimed in any one of claims 1 to 8, wherein an adjustable straight edge is provided which is

pivotable about the set point and extends from the set point to positions beyond the or all of the scales of pitch angles, said straight edge capable of being aligned by its edge or a setting line with the selected pitch angle on one of the scales.

11. A tool as claimed in claim 10, wherein the straight edge comprises two strips attached together and spaced apart so that the triangular sheet can slide between them with a close fit.

12. A tool as claimed in claim 10, wherein a screw adjustment is slidable along an arcuate slot formed in the triangular sheet and serves to clamp the strips and sheet together after the appropriate pitch angle has been selected.

13. A tool as claimed in claim 10, 11 or 12 when appended to claim 5, wherein the straight edge is provided with windows through which numerals indicating the set scale and rafter length per metre run can be viewed.

14. A tool as claimed in claim 1, substantially as described with reference to Figures 1, 2 and 3 or Figures 4 and 5 of the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17 (The Search Report)

Application numbe 9122183.8

Cate

Relevant Technical fields

(i) UK Cl (Edition K) F1B

(ii) Int Cl (Edition 5) F02B 25/,33/

Search Examin. R J DENNIS

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search 6 JANUARY 1992

Documents considered relevant following a search in respect of claims 1 TO 5

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB A 2115485 (N R D C....)	1,2 and 4
A	GB 1544681 (AC....)	1 and 4
A	GB 492886 (ERREN....)	1 and 4
PA	WO A1 91/02144 (KNITTED....)	1,2 and 5

ategory	Identity of document and relevant passages	Relevant to claim(s)

ategories of documents

: Document indicating lack of novelty or of ventive step.

: Document indicating lack of inventive step if ombined with one or more other documents of the ame category.

: Document indicating technological background nd/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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